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ABSTRACT

The study explored the organization of mentally retarded individuals' event knowledge and the relationship between social knowledge and performance in naturally occurring events. Twenty mentally retarded adults and 20 nonretarded preschoolers were asked to sequence photographs of events depicted in familiar and novel contexts. Preschoolers were unable to sequence events depicted in novel contexts, suggesting that young children may not possess scripts for the events as depicted. Mentally retarded individuals were better able to sequence events depicted in familiar contexts than in novel contexts, suggesting deficits in generalizing social knowledge. Observations of mentally retarded individuals in naturally occurring events indicated that actual social behavior was unrelated to event knowledge. (Author/DB)

# KNOWLEDGE AND PERFORMANCE OF SOCIAL "SCRIPTS" BY THE MENTALLY RETARDED

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## Abstract

This study explored mentally retarded individuals' script-based knowledge and performance of routine events. Twenty mentally retarded adults and 20 nonretarded preschoolers were asked to sequence photographs of events depicted in familiar and novel contexts. Preschoolers were unable to sequence events depicted in novel contexts, suggesting that young children may not possess scripts for the events as depicted. Mentally retarded individuals were better able to sequence events depicted in familiar contexts than in novel contexts, suggesting deficits in generalizing social knowledge. Observations of mentally retarded individuals in naturally-occurring events indicated that actual social behavior was unrelated to event knowledge.

Recent interest in the social competence of the mentally retarded has paralleled the trend toward providing community-based services for these individuals. Community-based services are intended to neutralize stigmatizing effects of social deviance by integrating mentally retarded individuals into normal settings. However, efficacy studies indicate that deficits in social competence are a major obstacle to the mentally retarded individual's successful integration into the community, (e.g. see Lakin, Hill, Hauber, Bruininks & Heal, 1983; Landesman-Dwyer & Sulzbacher, 1981).

Despite the importance of social competence in determining successful community placement, much of the present research is insufficient in explaining the actual social behavior of mentally retarded individuals (Greenspan, 1979; Simeonsson, Monson & Blacher, 1984). Efforts to understand these social deficits have focused primarily on identifying abilities, such as role taking (DeVries, 1970), moral judgment (Perry & Krebs, 1980) and person perception (Miller & Gottlieb, 1972), which differentiate mentally retarded individuals from their non-retarded peers. These studies are of limited value of in explaining retarded individuals' maladaptive social behavior because researchers have primarily relied on verbal measures of social competence despite evidence that mental retardation is often associated with language impairments. Further, the

constructs have been explored in artificial settings and not in naturally-occurring contexts.

One approach to the study of social competence which considers the relation among knowledge, behavior, and context involves the investigation of the cognitive structures underlying social behavior. These structures, which have been termed schemata (Rumelhart & Ortony, 1977), have been described as organized cognitive representations of knowledge which function, in part, as plans for interpreting and acting upon specific stimulus information (Neisser, 1976).

Schank and Abelson (1977) define schema as a knowledge base involving a sequence of actions related temporally and causally. They refer to action schema as scripts. According to Schank and Abelson, scripts are cognitive representations of prototypic events in which elements such as roles, props, and actions are specified. These elements are sequentially organized toward an overall goal, and component actions may be organized toward subgoals. Frequently cited examples of scripts include routine events such as eating at a restaurant, grocery shopping, or going to the doctor. Nelson (1981) suggests that scripts guide routine encounters by providing a shared framework for interacting with others and by facilitating generalization across situations.

Several investigations have demonstrated that adults and children organize knowledge of events in script form. Bower, Black and Turner (1979) asked college students to generate actions usually encountered in one of five events, including eating at a restaurant and getting up in the morning. Considerable agreement was found on the sequence and components (i.e., actions, roles, props, mentioned for each event). Nelson and her colleagues (Nelson, 1978, Gruendel, 1980; Nelson, 1986) found evidence of schematically organized social information in a series of studies involving children as young as three years of age. When interviewed about routine events, such as having dinner and going to a birthday party, children reported a common s t and sequence of acts.

Most researchers have assumed that event representations are comprised of verbally accessible knowledge structures. However, it is presently unknown whether knowledge is represented verbally, nonverbally, or both. The few studies (Brown, 1975; Brown & Murphy, 1975) which employ nonverbal tasks indicate that nonverbal indices of schematic organization are equally or perhaps more sensitive to knowledge of event order than are verbal measures. For example, Brown (1975) compared children's ability to sequence pictures of events with their ability to verbally recall the same events and found that active nonverbal reconstruction was superior to verbal recall.

Because script-based event knowledge contributes to social competence and is nonverbally accessible, the present study employed a schema approach to social cognition in exploring mentally retarded individuals' knowledge of routine events. Evidence that mentally retarded individuals lack script-based event knowledge or fail to apply this information in real-life events may provide insight into their inadequate social performance. The objectives of this study were to investigate the organization of mentally retarded individuals' event knowledge and to explore the relation between social knowledge and performance in naturally-occurring events.

## Method

### Sample

Twenty mentally retarded group home residents and twenty nonretarded preschool children participated in the study. The mentally retarded subjects ranged in age from 26 to 56 ($M$ = 36). Their IQs ranged from 11 to 69 ($M$ = 40.8, $SD$ = 17.9). Mentally retarded subjects were recruited from three group homes in New York City, each having lived in the same group home for at least one year.

Nonretarded subjects were recruited from a nursery school in New York City. The children ranged in age from 3.6 to 5.0 (mean age = 4.2, $SD$ = .4). None of the children were diagnosed as having any handicapping conditions.

Materials

Two sets of stimulus materials for each of two events were used in the photograph sequencing task. The two events probed were (1) having dinner at home and (2) getting ready for work/school. Each set of stimulus materials consisted of five 5" x 3 1/2" color photographs depicting the acts within the event. In the event of "having dinner at home," the set of photographs depicted washing hands, setting the table, serving, eating, and clearing the table. In the "getting ready for work/school" event, the depicted sequence included getting out of bed, washing, dressing, having breakfast, and leaving the house.

For each event, one set of photographs depicted a familiar context and one set depicted a novel context. For group home residents, the set of photographs depicting the residents in their own group home was the familiar context, and the set depicting the event in a single family home situation was the novel context. For nonretarded subjects, the photograph set depicting the event in a single family home was the familiar context and the photographs taken within a group home was the novel context. Independent judges determined that the same actions were depicted in each setting.

Four copies of each set of photographs depicting group home residents in familiar contexts were used in the sequence recognition task. Each set of five photographs

were attached horizontally in one of four arrays. The arrays consisted of one correct sequence, one sequence with two adjacent acts misordered, one sequence with four adjacent acts misordered and one sequence with all five acts misordered. Subjects were required to select the correct sequence from these possibilities.

Procedure

All subjects were tested individually in single sessions. Prior to administering the experimental tasks, all subjects were tested for their ability to identify the acts depicted in each of the photographs. The four retarded individuals who were unable to reach 100% accuracy in the identification of the photographs were excluded from the study.

During the testing session, subjects were told that they would be seeing a group of photographs showing "what happens" at dinner or in the morning. The set of five photographs were placed in a random order in front of the subject. Subjects were instructed to point to or position the photographs in a row to show "what happens" at dinner or in the morning in the order in which it usually occurs. If the subject did not respond within 5 seconds of the cue, an additional prompt was provided (e.g. "what happens next?"). The same instructions were provided for the remaining three sets of photographs.

Mentally retarded subjects were also asked to choose the correctly sequenced array of photographs, given four arrays for each of two event sequences. The order of the four arrays was counterbalanced to ensure that each event sequence occurred equally often in each position. The photograph sequence and recognition tasks were presented in a random order, as were the two events within each task.

Group home residents were observed at dinnertime and on a weekday morning. Observations during dinner were videotaped. Observations in the morning were directly recorded rather than videotaped to ensure privacy.

## Coding of Observational Data

Observational data for both event sequences were coded for sequence (the order in which the act occurred) and for the type of assistance needed to begin or complete an act. Specifically, each act was coded to indicate whether the behavior was independently initiated and performed or whether assistance was provided to the individual. Interrater reliability for both the coding of direct observations and the coding of videotapes ranged from .91 to .97.

## Scoring Procedures

The photograph sequencing task and sequence recognition task were scored for accuracy. The "correct" sequence was determined on the basis of repeated observations in each of

the participating group homes, interviews with direct care workers, and interviews with individuals living with their families. In the event of "getting up in the morning," the sequence most consistently observed and reported was waking, brushing teeth dressing, eating breakfast, and leaving. In the event of "having dinner" the most commonly occurring sequence was setting the table, washing hands, serving the food, eating dinner, and washing the dishes.

Sequencing scores were calculated from the number of contiguous pairs of acts accurately sequenced. One point was awarded for each correct contiguous pair such that scores ranged from 0 to 4 for each event. Scores in the sequence recognition task corresponded to the number of accurately ordered contiguous pairs presented in the array such that the scores ranged from 1 to 4 for each event.

## Results

### Event Sequencing Ability

Mean scores for sequencing photographs of routine events are presented in Table 1. A 2 x 2 x 2 ANOVA with repeated measures was performed on sequencing scores. Group (mentally retarded and nonretarded) was a between subjects factor. Contextual familiarity (familiar and novel) and Event (dinnertime and morning) were within subjects factors. Significant main effects were found for two independent variables: Familiarity, $F(1,38) = 16.32$, $p<.01$, and Group

$F(1,38) = 14.33$, $p<.01$. Two significant first-order interactions were found: Group x Familiarity, $F(1,38) = 4.88$, $p<05$, and Group x Event, $F(1,38) = 6.47$, $p<.05$.

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Insert Table 1 about here

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Further analyses of sequencing scores were conducted to ensure that factors other than chance account for these differences. Scores for groups within each event condition were significantly better than chance, including the mentally retarded group in the dinnertime and morning events, $(4, N = 40) = 95.32$, $p<.01$; $(4, N = 40) = 660.29$, $p<.01$, and the nonretarded group in the dinnertime and morning events, $(4, N = 40) = 27.22$, $p<.01$; $(4, N = 40) = 12.67$, $p<.05$). Scores for the mentally retarded group in the familiar and novel contexts also differed significantly from chance $(4, N = 40) = 368.92$, $p<.01$; $(4, N = 40) = 138.64$, $p<.01$. Scores for the nonretarded group in the familiar context were significant, $(4, N = 40) = 30.10$, $p<.01$. However scores for nonretarded children in the novel context did not exceed chance levels.

Analysis of the recognition scores indicated that the correct sequence was selected more than half the time and that the most misordered sequence was selected less than one quarter of the time. A significant relation between sequencing photographs of familiar events and recognition of

event sequences was found in the morning event ($r$=.30, $p$<.05).

Performance in Naturally-Occurring Events

The mean number of acts observed for each resident in the morning was 4.9. The mean number of acts observed at dinnertime was 3.2. There was a positive correlation between frequency of participation observed per resident and the resident's ability to sequence photographs of the morning event, ($r$ = .41, $p$<.01).

Although subjects did not complete all of the acts at dinnertime, the observed sequence of acts was consistent across all subjects and corresponded to the scripted or "correct" order. In the morning all residents participated in each of the acts, but the acts were generally not completed in the "correct" order. However, the majority of subjects who were observed in events whose sequence differed from the expected sequence correctly ordered the acts in the photograph sequencing task. Photograph sequencing scores for residents who performed the events in an unexpected order were significantly better than chance, (4, $N$ =16) = 474.36, $p$<.01.

Staff provided a greater number of initiating and total prompts at dinnertime ($M$ = 2.6; 7.6) than in the morning ($M$ = 1.8; 6.6). The frequency of prompts needed to perform the acts in naturally-occurring events was unrelated to event

knowledge as measured by performance of the photograph sequencing task.

## Discussion

The results of this investigation suggest that mentally retarded individuals possess schematically organized, or script-based, knowledge of the investigated routines (having dinner and getting ready for school/work). Performance in both the photograph sequencing task and the recognition task was significantly greater than chance and performance in the two tasks was significantly related, suggesting that mentally retarded individuals have knowledge of event order and are able to use this information to determine and evaluate depicted event sequences.

The findings further indicate that retarded individuals know what typically happens at dinnertime and in the morning even though they may behave differently in actual situations. In fact, a significant number of retarded individuals "corrected" the sequence of events followed in their group homes to show a more typical order of events on the photograph sequencing task.

Although mentally retarded individuals seem to possess knowledge of routine events, it appears unlikely that this information will be spontaneously applied in novel situations. This finding is consistent with previous research demonstrating the lack of generalization when

investigating memory and problem solving tasks (Blackman & Lin, 1984). The present research suggests that the generalization deficits of mentally retarded individuals extend to their knowledge of everyday social events. Mentally retarded individuals' maladaptive social behavior may be a function of the inability to generalize existing event knowledge rather than lack of information about the event.

Results indicating that mentally retarded adults possess greater knowledge of routine events than do nonretarded children of comparable mental age support the notion that mentally retarded individuals possess knowledge of routine events and further suggest that event knowledge may be determined by the individuals' experience with the routine over time. However, there are several alternative explanations for the results. Possibly, the familiar context condition was not equivalent across groups in that mentally retarded subjects viewed photographs taken within their own group home and the children viewed photographs of a family they had never met. Moreover, the consistency in which routine events were experienced by retarded individuals living in structured environments may have facilitated their performance.

Because the preschoolers were unable to sequence events depicting novel settings this study suggests that preschoolers may not possess scripts for having dinner and

getting up in the morning. This finding is contrary to results of previous investigations in which young children's verbal reports of script-based events were investigated (Nelson, 1978; Gruendel, 1980). However, the only data supporting children's ability to generalize knowledge to novel events were the children's use of general terms (i.e., using third person pronouns and speaking in the present tense when recalling events). Therefore, the present findings may differ from earlier reports because nonverbal, rather than verbal, measures of event knowledge were employed. Although the present investigation is unclear as to whether nonverbal representations of knowledge exist in addition to, or in lieu of, verbal representations, sole reliance on verbal indices of scripts may inadequately reflect event knowledge.

Observations of retarded individuals in naturally-occurring events support the contention (Slackman, 1985) that event knowledge is dependent on participation in the actual event. The results indicated that the greater the frequency of participation in the event the more likely the individual was to accurately sequence photographs of the event.

Most importantly, the present study suggests that mentally retarded individuals' performance in the actual event may not be guided by the individuals' knowledge. While the individuals may have known what to do in each of

the events, they did not necessarily begin or complete the component acts independently.

The suggestion that retarded individuals' behavior is not guided by their knowledge has critical implications both to the understanding of these individuals and to research in cognitive psychology. A major goal in the education of retarded individuals is to facilitate independence in community-based settings. Therfore, it is critical that these settings provide residents with the opportunity to use and enhance their knowledge. If the structure and organization of the residences prevent an individual's application of learned skills, as is suggested in the present study, then community-based services may be no less restrictive than the institutions they were intended to replace.

Further, evidence that knowledge demonstrated on an experimental task may not be related to performance in real-life events challenges a critical and often untested assumption in cognitive psychology. For the most part, cognitive psychologists have failed to relate knowledge to normally-occurring behavior (Neisser, 1976). The findings indicate that the assumption of a direct link between knowledge and behavior may be too simplistic given the complexity of human behavior and the contexts in which these behaviors occur. Clearly, future investigations of the social behavior of group home residents must consider the

contextual variables which foster or inhibit social competence. Subsequent investigations should also be concerned with exploring the nature and development of mentally retarded individuals' event knowledge to provide understanding of their social incompetence and to determine training strategies which may improve their independence and adaptability in social situations.

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Table 1

Mean Event Sequencing Scores of Mentally Retarded and Nonretarded Subjects

| | Dinnertime | | | | Morning | | | |
|---|---|---|---|---|---|---|---|---|
| | Familiar context | | Novel context | | Familiar context | | Novel context | |
| Group | M | SD | M | SD | M | SD | M | SD |
| MR | 1.22 | 1.00 | .88 | .80 | 2.02 | 1.85 | 1.57 | 1.66 |
| NMR | .85 | .84 | .90 | 1.10 | .89 | .82 | .60 | .38 |